N-ViewOPC
OPC Server &
Diagnostic Monitor

User Manual

Version 10.2.0

Revision 150515

Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.the-red-lion.net - Email: info@the-red-lion.net

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US Patent 6,728,262

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Introduction

The N-Tron Switches that are N-View capable generate a periodic multicast Ethernet frame for every port. This frame is then received and made available to the N-View OPC server and can be displayed by the N-View diagnostic monitor software.

The N-ViewOPC Server & Diagnostic Monitor is a Windows program that:

- creates and configures the database used by the OPC server, and/or
- can be used to monitor diagnostic data from the switch, and/or
- can launch N-View from a batch file, and have it generate a list of all the switch aliases that it found on-line and output that information to a text file.

The N-ViewOPC Server is a Windows service that runs after closing N-ViewOPC. The Server supplies configuration and real time tag data to the OPC Client. Only one OPC client can communicate with the N-ViewOPC Server at a time.

Note: The N-ViewOPC configuration must be completed prior to connecting an OPC client to the N-ViewOPC Server. The configurator must be saved and closed before the OPC client is connected to the N-ViewOPC Server. Failure to follow this rule may cause application errors.

Compatibility

For use with all N-View capable N-Tron switches, including:

- 300 Series (with –N extension)
- 500 Series (with –N or –A extension)
- 700 Series
- 7000 Series
- NT24k Series

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Installing N-View Diagnostic Monitor Software

Minimum System Requirements:
Windows XP with Service Pack 3 (32 Bit Only), Windows 7 (32 Bit Only) with Administrator Privileges, or Windows 8 (32 Bit Only) with Administrator Privileges.

1. Insert the N-Tron Product CD into your CD/DVD drive.
2. In the event the main index page is not displayed automatically, you may load the page by browsing to the root folder of the CD/DVD drive and Double-Clicking on the index.html file.
3. Click on the heading labeled SOFTWARE then expand the N-View folder.
4. Double-Click on the setup executable file to begin the software installation process. Note, some web browsers may require you to save a local copy to your system before running the setup executable.
5. Finish the setup by following the on screen prompts.

To install a previous version of N-ViewOPC, the current version must first be uninstalled.

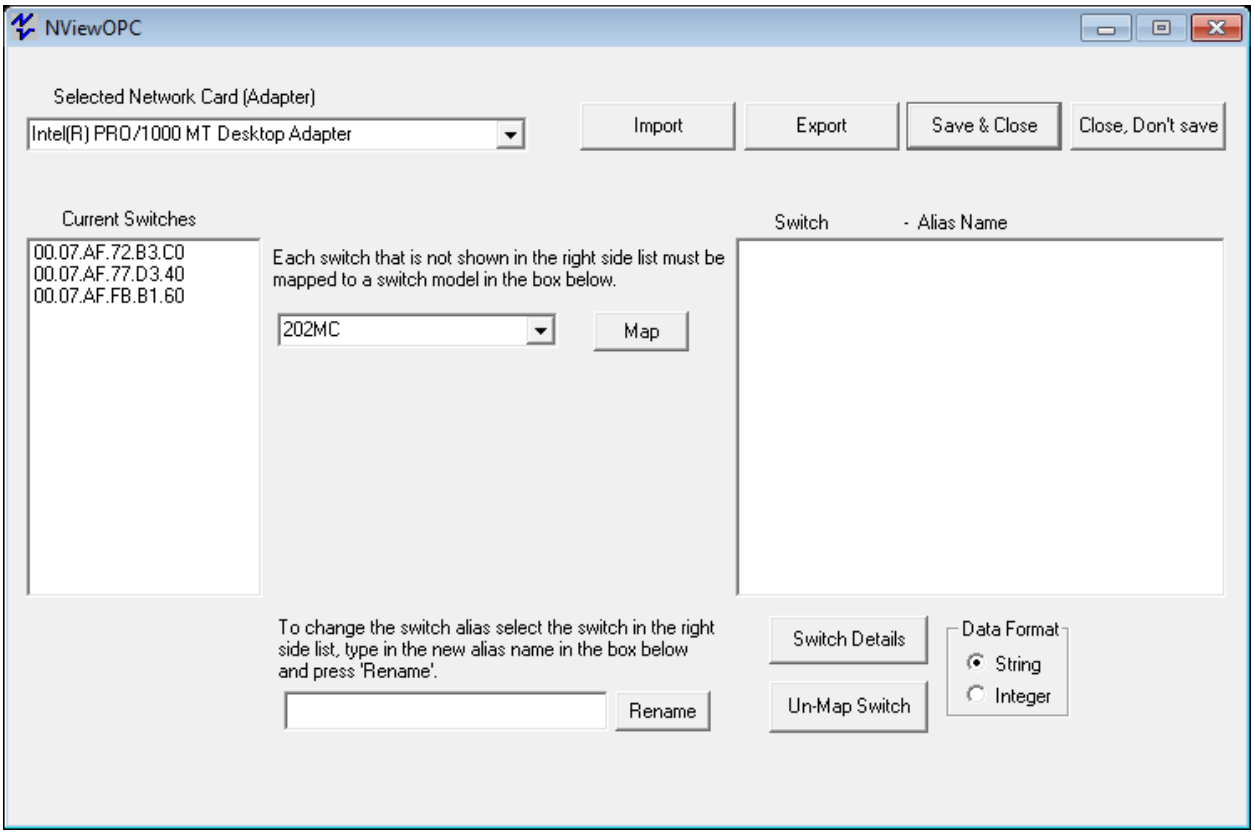
Configuring N-View

Detecting N-Tron Switches

Start by opening the N-View Diagnostic Monitor application. The shortcut can be found here:
Start > Programs > N-Tron > N-View

When run on Windows 7 or later, N-ViewOPC must be run as an Administrator.

A screen similar to the following should appear:



If the Network Adapter that is displayed by default is not the adapter to which the switches of interest are connected, then select the correct adapter.

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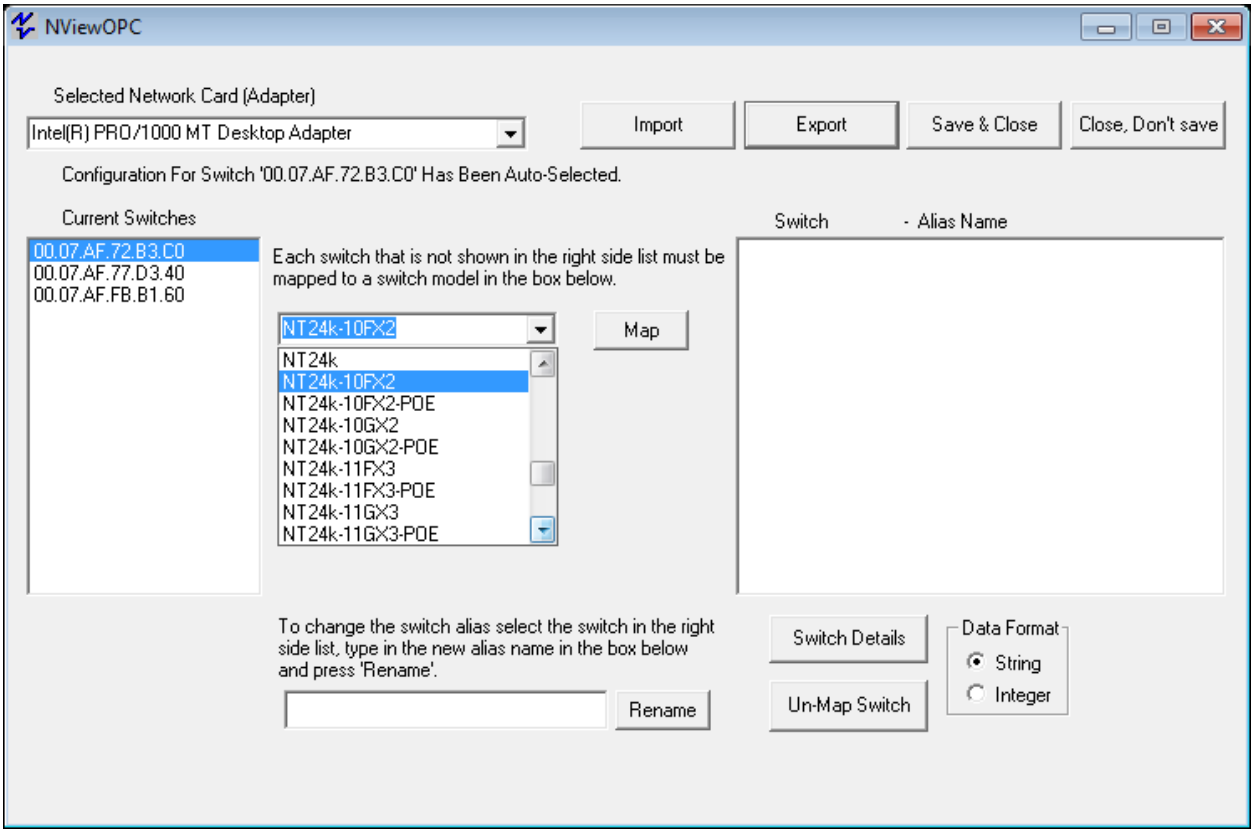
Mapping Switches

The mapping of a switch is required to access any information about that switch. To map a switch, select the switch of interest in the **"Current Switches"** window, and define the switch model from the configuration pull downs:



Several N-Tron switches report their model and configuration to N-View, and in those cases the switch model and configuration may automatically fill in the configuration values. These include all 700, 7000, NT24k and the –N and –A versions of several of the 500 series switches. Verify that these values are correct on both N-View and the switch before proceeding to map it. Note that the N-View values will reflect the user's configuration for several switch versions.

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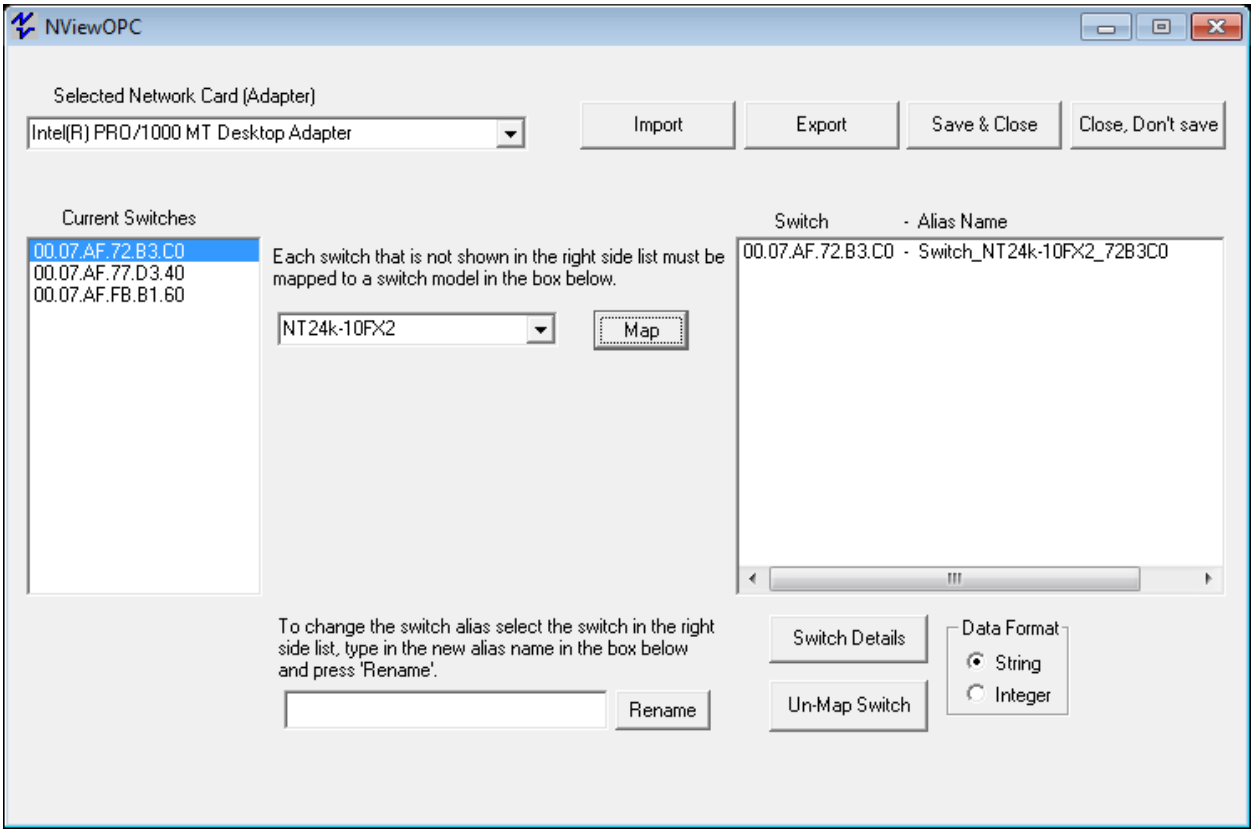
If the selected switch does not contain slots or modules to be configured or verified, select the **"Map"** button:
(More on configuring slots and modules below)



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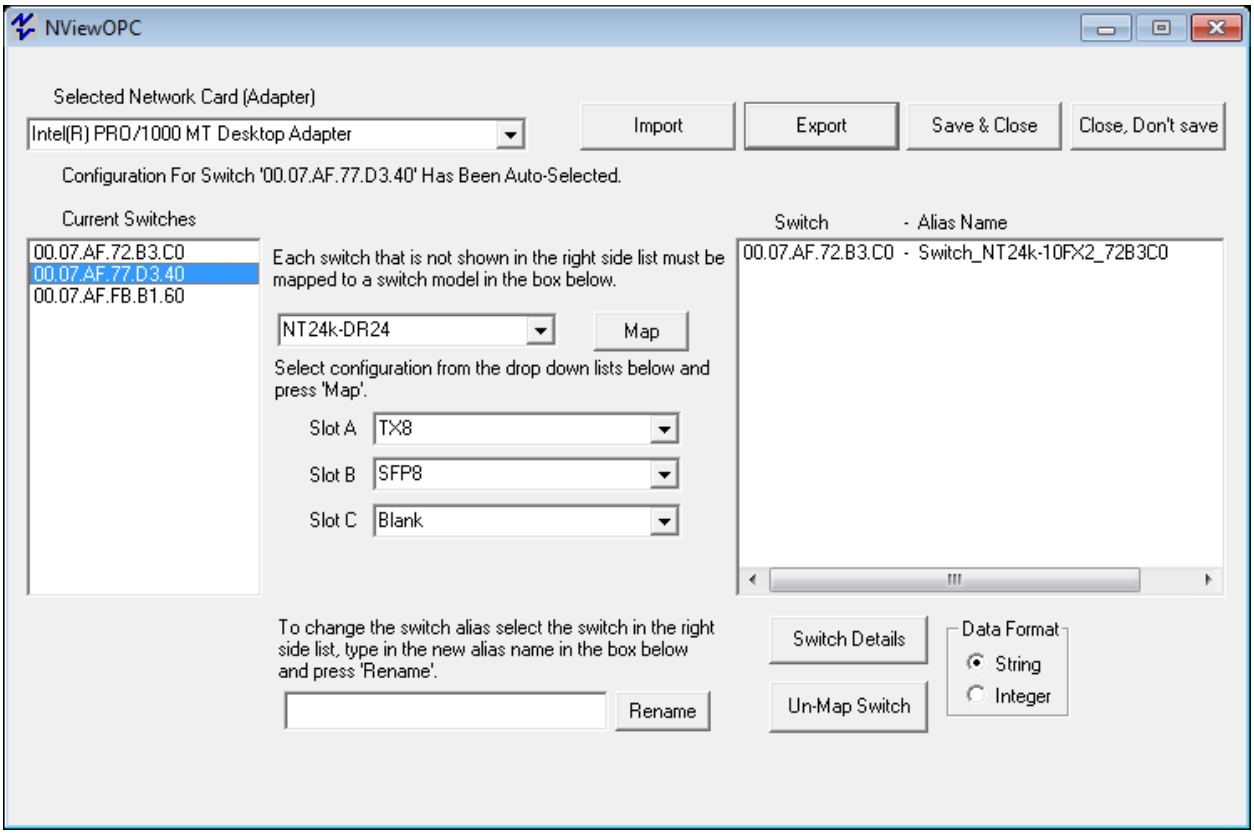
Configuration of Modular Switches with Slots

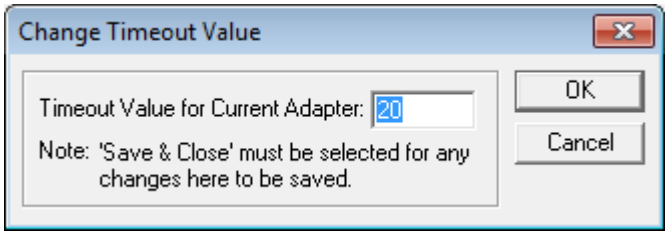
Several switch models are modular and have slots which can be populated with several kinds of modules. The available modular slot configuration pull downs are shown below the model name after selecting the switch model. The following is an example of what may be shown. The number and name of the modules will vary and be specific to the model being viewed.



Once the modules have been configured or verified, you may select the "**Map**" button.

Changing Monitor Timeout (Optional)

If desired, you can change the timeout value of the monitor by selecting **"Change Timeout Value…"** from the system menu, which is accessible by clicking the N-View icon located in the upper left corner of the main window. This value has a range of 20-1500 seconds. If a switch has become unreachable, after this time the values shown on the monitor will be invalidated (NA). If a switch hasn't sent data associated with a port on the switch, all items associated with the port will be invalidated (NA) after this time. Each adapter can have its own value for monitor timeout.


Change Timeout Value
Timeout Value for Current Adapter:
20
Note: 'Save & Close' must be selected for any changes here to be saved.
OK
Cancel

If changed, **"Save & Close"** must be selected to save this value.

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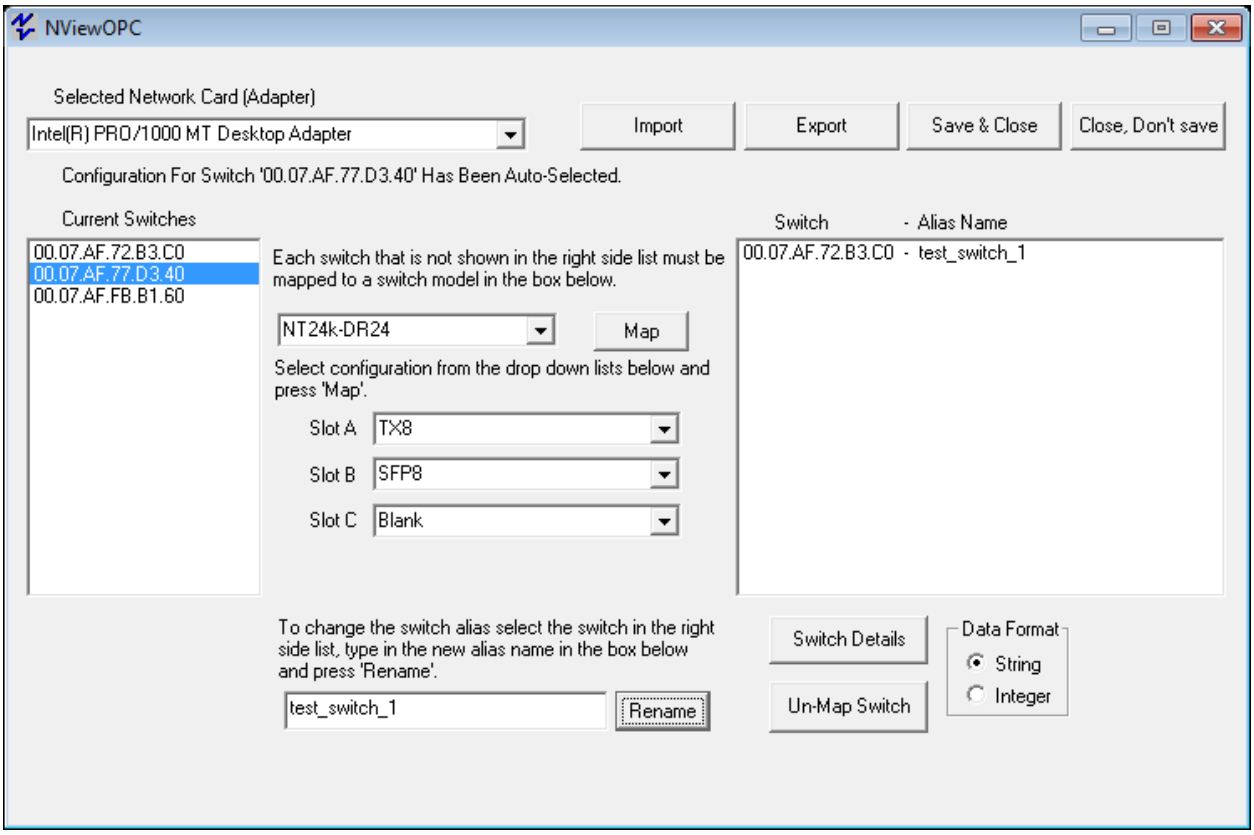
Assigning Switch Aliases (Optional)

Next, if desired, you can give the switch an Alias Name by highlighting the switch in the right side window, typing an Alias Name, and selecting the **"Rename"** button:

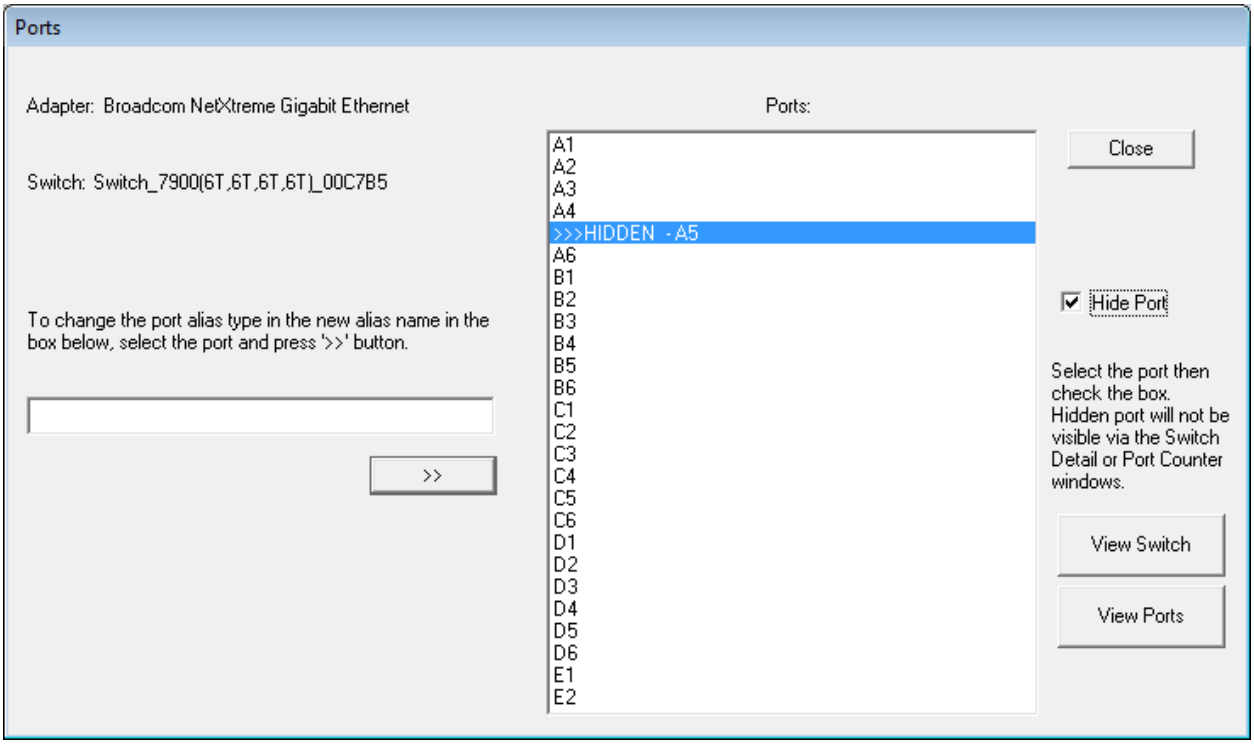

NViewOPC
Selected Network Card (Adapter)
Intel(R) PRO/1000 MT Desktop Adapter
Import
Export
Save & Close
Close, Don't save
Configuration For Switch '00.07.AF.77.D3.40' Has Been Auto-Selected.
Current Switches
00.07.AF.72.B3.C0
00.07.AF.77.D3.40
00.07.AF.FB.B1.60
Each switch that is not shown in the right side list must be mapped to a switch model in the box below.
NT24k-DR24
Map
Select configuration from the drop down lists below and press 'Map'.
Slot A TX8
Slot B SFP8
Slot C Blank
Switch - Alias Name
00.07.AF.72.B3.C0 - test_switch_1
To change the switch alias select the switch in the right side list, type in the new alias name in the box below and press 'Rename'.
test_switch_1
Rename
Switch Details
Un-Map Switch
Data Format
String
Integer

Users can assign switches custom alias names to create meaningful values. A switch alias can contain up to 35 characters, and cannot contain spaces, periods, or hyphens. A switch alias can have underscores.

Changing the switch alias in N-View does not change the name on the switch itself. This change is only tracked locally.

Hiding Ports (Optional)

Next, select the switch and click on **"Switch Details"**. The Ports window will appear. This allows you to hide unused ports, or to assign an alias to a port. Select the port to be hidden, and click the **"Hide Port"** checkbox:

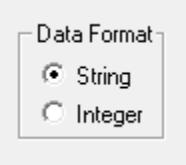


If desired, follow the directions in the window to assign a port alias. A port alias can contain up to 24 characters, and cannot contain spaces, periods, or hyphens. A port alias can have underscores.

Changing the port alias in N-View does not change the name on the switch itself. This change is only tracked locally.

Setting Data Format (Optional)

When the N-ViewOPC server communicates with the OPC Client, it can provide the switch data in either a string or integer format. The string format provides clear readable text for each data element whereas the integer format may need mapping to understand its value. See section "N-ViewOPC Server & Diagnostic Monitoring" for more information about this mapping.



To set this value, use the *Data Format* selection box in the lower right hand corner of the main window.

Saving the Configuration

Once the remapping has been completed, the configuration must be saved to allow for use of the configuration next time the N-View monitor is opened.

After configuring the ports, close the windows back to the initial (main) window.

After configuring all switches and ports, select **"Save & Close"** at the main window.

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Export/Import Configuration Feature

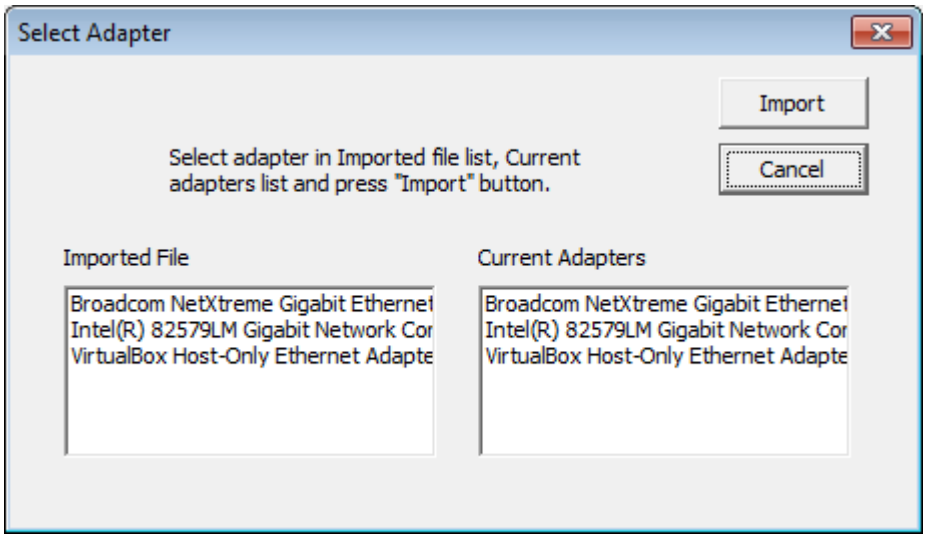
N-View includes an export/import feature that allows easy and accurate transfers of switch and port alias configurations from one PC to another. Perform an export on a source PC, bring the exported file to the target PC, and import it there. Selecting **"Save & Close"** will result in the switch and port aliases from the source PC being available on the target PC.

Exporting the Configuration

After configuring all switches and ports, the configuration must be saved before it is closed. Select **"Save & Close"** at the main window. Re-open N-View and select **"Export"** on the main N-View. The export location defaults to the user's application data folder, though that can be changed.

Importing the Configuration

Select **"Import"** on the main N-View screen and locate the file to be imported. After selecting the file and pressing **"Open"**, the following will be displayed:



Select one NIC in each window to assign which LAN the mapped and aliased switches are coming from (on source PC) and going to (on target PC).

The import will append the imported switches to those previously mapped to that NIC. Note that if the same switch (same unique MAC) was already mapped and is *also* mapped on the import file, it will be remapped based upon the import file.

Once the remapping has been completed, select **"Save & Close"** to save the configuration.

N-ViewOPC Server & Diagnostic Monitoring

Once a switch has been mapped, it can be monitored. Monitoring allows the user to review data specific to the switch and its ports. If a switch becomes unreachable, all values associated with that switch are invalidated (NA) after a user definable timeout period. If a switch doesn't send any data associated with a port, all values associated with that port are invalidated (NA) after the same timeout period (Defaults to 20 seconds).

The switch data can be monitored in two ways, through an OPC client or through the N-View GUI interface. The OPC Client and the N-View Monitor will display some data differently. When this occurs, it is noted.

Switch Values

Switch Values are shown on the Switch Details window and the Port Counters window.

Data Element	Description	Value
Switch (Alias)	Switch Name/Alias	Ex.: Switch_Nt24k-DR24
IP Address	Switch IP Address (Only shown on switches with IP Addresses)	Ex.: 192.168.1.50

OPC Specific Values

Data Element	Description	Value
Status	Indicates if the switch is Online or Offline	0 = Offline 1 = Online
Last_Update	Seconds since last data update from the switch	
MAC_Address	MAC address of the switch being monitored	Ex.: 00.07.AF.00.A6.A0
TotalPorts	Total number of ports on the switch	
MAC0 Through MAC5	Only available in integer mode. Six values representing the Switch MAC Address. MAC0 is the first value.	
IP0 through IP3	Only available in integer mode. Four digits representing the Switch IP Address. IP0 is the first digit.	

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N-Ring Values

N-Ring Values are shown on the Switch Details window and the Port Counters window only on N-Ring capable switches. They will not be shown on switches that are not N-Ring capable.

Data Element	Description	Value
N-Ring Manager	Indicates if the switch is in N-Ring Manager Mode	0 = No or N/A 1 = Yes (N/A if no N-Ring Capability)
N-Ring Member	Indicates if the switch is an Active N-Ring Member	0 = No or N/A 1 = Yes (N/A if no N-Ring Capability)
N-Ring State	Indicates the current N-Ring State if the switch is an N-Ring Manager	0 = Fault (Also no N-Ring) 1 = Partial Fault (low rx) 2 = Partial Fault (high rx) 3 = Ok 4 = Not Manager (N/A if no N-Ring Capability)
N-Ring Version	Indicates the version of the N-Ring Protocol	(0 if no N-Ring Capability)

Port Status Values

Port Status Values are shown on the Switch Details window and/or the Port Counters window.

Data Element	Description	Value
Port	User assigned port alias name. A port alias can contain up to 24 characters, and cannot contain spaces.	
Duplex	Reflects the current duplex of the particular port.	0 = N/A (if link is down) 0 = Half 1 = Full
Link Status	The current status of the port	0 = Down 1 = Up
Speed	The current speed of the port	10, 100, 1000, or /NA
Usage	Current bandwidth utilization shown from RX or TX, whichever is greater.	0 to 100 %

OPC Specific Values

Data Element	Description	Value
Alias	User assigned port alias name. A port alias can contain up to 24 characters, and cannot contain spaces.	

Last_Update	Seconds since last data update from the switch for the port	
PortId	The numerical value of the port.	

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Port Traffic Variables

Port Traffic Variables are shown on the Port Counters screen and have 32 bit accuracy. These parameters thus have a range of 0 to 4,294,967,295, and roll over through zero (to 1, 2…) if that number is exceeded.

Packet Size Information

Data Element	Description
64 Packets	The number of packets (including error packets) 64 bytes in size that have been received by the port, except that for the 9000 it is transmitted and received packets total.
65 to 127 Packets	The number of packets (including error packets) between 65 and 127 bytes in size that have been received by the port, except that for the 9000 it is transmitted and received packets total.
128 to 255 Packets	The number of packets (including error packets) between 128 and 255 bytes in size that have been received by the port, except that for the 9000 it is transmitted and received packets total.
256 to 511 Packets	The number of packets (including error packets) between 256 and 511 bytes in size that have been received by the port, except that for the 9000 it is transmitted and received packets total.
512 to 1023 Packets	The number of packets (including error packets) between 512 and 1023 bytes in size that have been received by the port, except that for the 9000 it is transmitted and received packets total.
1024 to 1522 Packets	The number of packets (including error packets) between 1024 and 1522 bytes in size that have been received by the port, except that for the 9000 it is transmitted and received packets total.

Receive Packet Information

Data Element	Description
Rx Octets	The total number of bytes that have been received over the port, including bad packets.
Rx Good Octets	The total number of bytes in all good packets that have been received over the port.
Rx Broadcast Packets	The total number of good packets that have been received over the port that are directed to the broadcast address.
Rx Multicast Packets	The total number of good packets that have been received over the port that are directed to multicast addresses.
Rx Unicast Packets	The total number of good packets that have been received over the port that are directed to unicast addresses.
Rx Pause Packets	The number of PAUSE frames received by a port. The PAUSE frame must: have a valid MAC Control frame EtherType field; have a destination MAC address of either the MAC control frame reserved multicast (01-80-c2-00-00-01) or the unique MAC address associated with the specific port; have a valid PAUSE opcode, (00-01); be a minimum of 64 bytes in length; and have a valid CRC.

Transmit Packet Information

Data Element	Description
Tx Octets	The total number of bytes that have been transmitted over the port.
Tx Collisions	The total number of collisions that have been experienced over the port during packet transmissions.
Tx Multiple Collision	The number of packets successfully transmitted by a port that experienced more than one collision.
Tx Single Collision	The number of packets successfully transmitted by a port that experienced exactly one collision.
Tx Broadcast Packets	The total number of good packets that have been transmitted over the port that are directed to the broadcast address.
Tx Multicast Packets	The total number of good packets that have been transmitted over the port that are directed to multicast addresses.
Tx Unicast Packets	The total number of good packets that have been transmitted over the port that are directed to unicast addresses.
Tx Pause Packets	The number of PAUSE frames transmitted by a port.

Port Error Variables

Port Error Variables are shown on the Port Counters screen and have 32 bit accuracy. These parameters thus have a range of 0 to 4,294,967,295, and roll over through zero (to 1, 2…) if that number is exceeded.

Receive Error Information

Data Element	Description
Rx Alignment Errors	The number of packets received by a port that have enough length between 64 and 1522 bytes, and have a bad FCS with a non-integral number of bytes.
Rx Dropped Packets	The number of good packets received by a port that were dropped due to the lack of resources. The counter is only incremented if the error was not counted by rx fcs errors, or rx alignment errors.
Rx FCS Errors	The number of packets received by a port that have enough length between 64 and 1522 bytes, and have a bad FCS with a non-integral number of bytes.
Rx Fragments	The number of packets received by a port that have less than 64 bytes, and have a either an FCS error or an alignment error.
Rx Jabbers	The number of packets received by a port that are longer than 1522 bytes and have either an FCS error or an alignment error.
Rx Oversize Packets	The number of good packets received by a port that are greater than 1522 bytes.
Rx SA Changes	The number of times the source address of good receive packets has changed from the previous value. A count of greater than one usually indicates the port is connected to a repeater based network.
Rx Symbol Errors	The total number of times a valid length packet was received at a port and at least one invalid data symbol was detected. The counter only increments once per carrier event and does not increment if a collision occurs during that event.
Rx Undersize Packets	The number of good packets received by a port that are less than 64 bytes in length.
Rx Excessive Disc Size	The number of good packets received by a port that are greater than 1536 bytes (excluding framing bits but including the FCS) and were discarded due to excessive length. Note: The Port rx over size pkts counter alone is incremented for packets in the range 1523 – 1536 bytes inclusive, whereas both this counter and the Port rx over size pkts counter are incremented for packets of 1537 bytes and higher.

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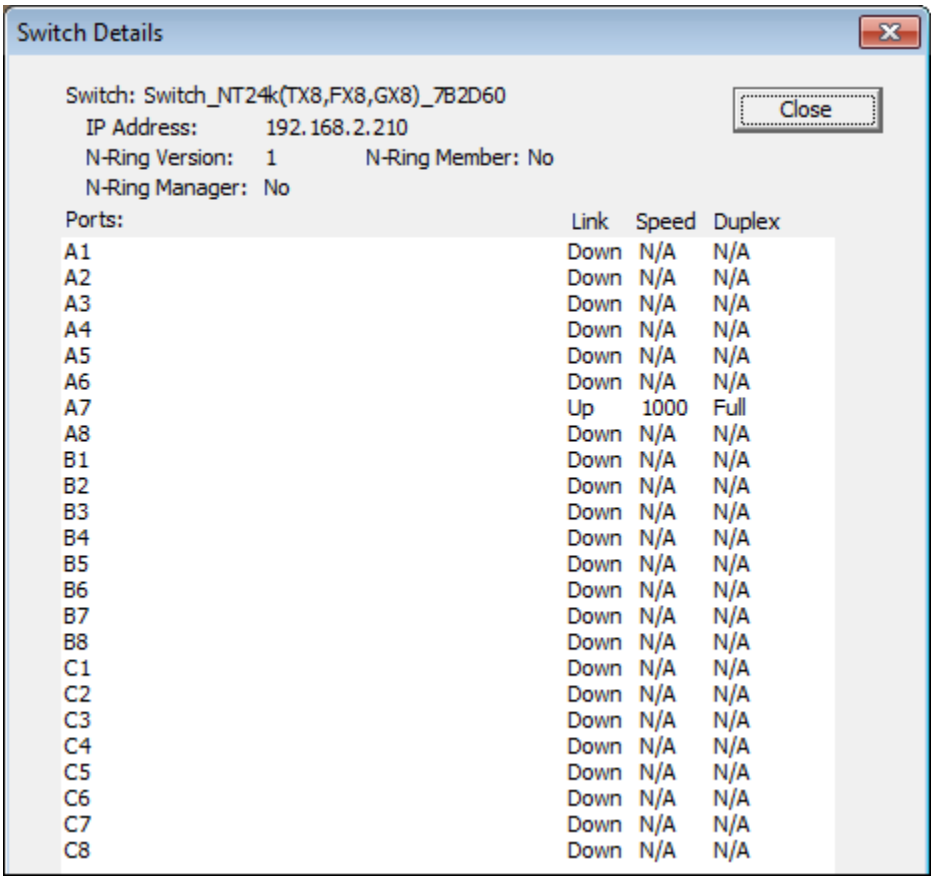
Transmit Error Information

Tx Deferred Transmit	The number of packets transmitted by a port for which the first transmission attempt is delayed because the medium is busy.
Tx Dropped Packets	The number of transmit packets dropped by a port due to the lack of resources. The counter is only incremented if the error was not counted by tx late collision, or tx excessive collision.
Tx Excessive Collision	The number of packets that are not transmitted from a port because the packet experienced 16 transmission attempts.
Tx Frame In Disc	The number of valid packets received which are discarded by the forwarding process due to lack of space on an output queue.
Tx Late Collisions	The number of times that a collision is detected later than 512 bit-times into the transmission of a packet.

Interpreting the Data

Starting from the main screen, as seen below, select a switch from the right hand window, then select **"Switch Details"**. From the Ports window, Choose **"View Switch"** to monitor switch details, or **"View Ports"** to monitor port counters:

Example of the "Switch Details" screen:



Note the IP Address and the N-Ring protocol version, which are presented from 700, 7000, 9000 and NT24k series switches.

Each 700, 7000, 9000 and NT24k series N-Ring Manager reports whether or not it is an N-Ring Manager, and the state of the N-Ring.

Each 700, 7000, 9000 and NT24k series switch also reports whether or not it is an active N-Ring member.

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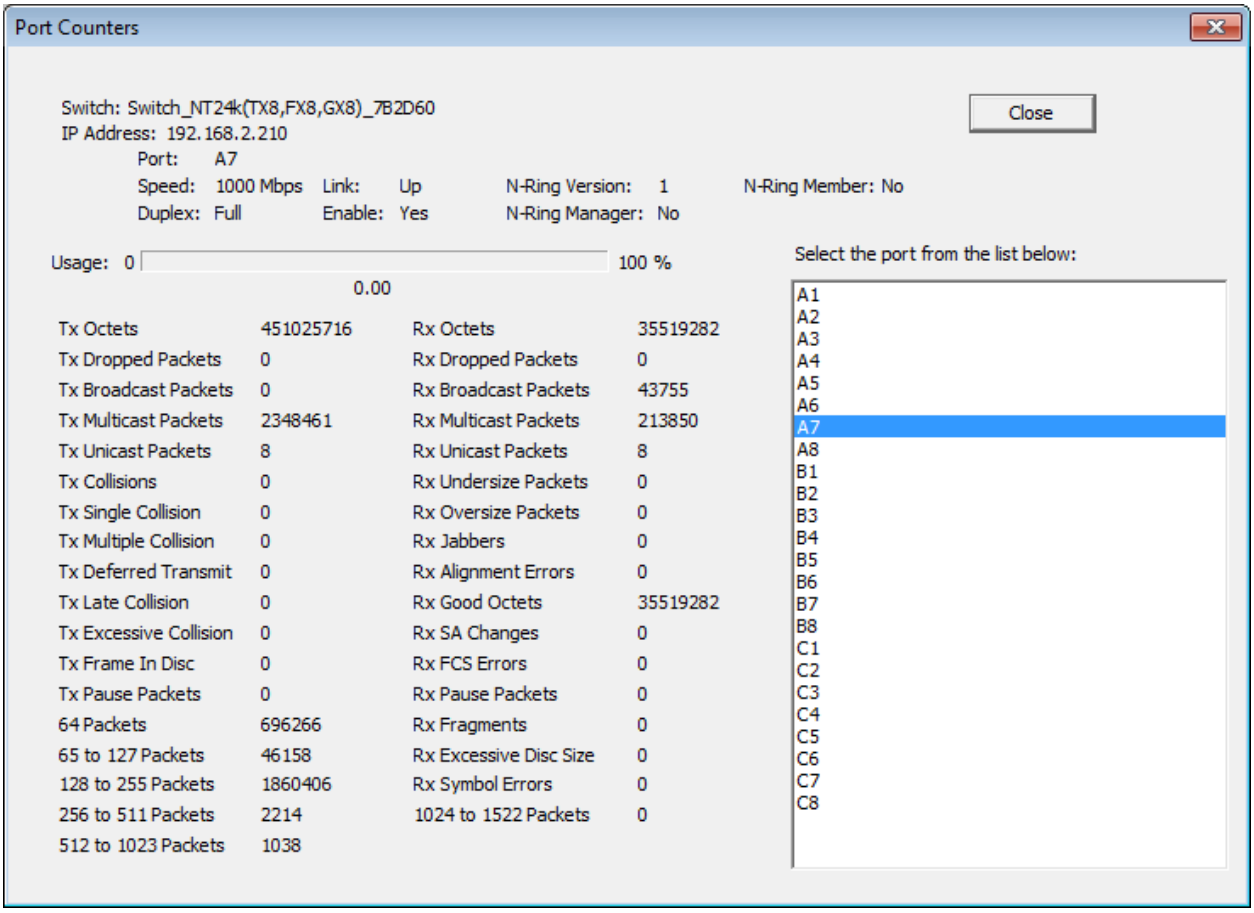
Example of the "Port Counters" screen:



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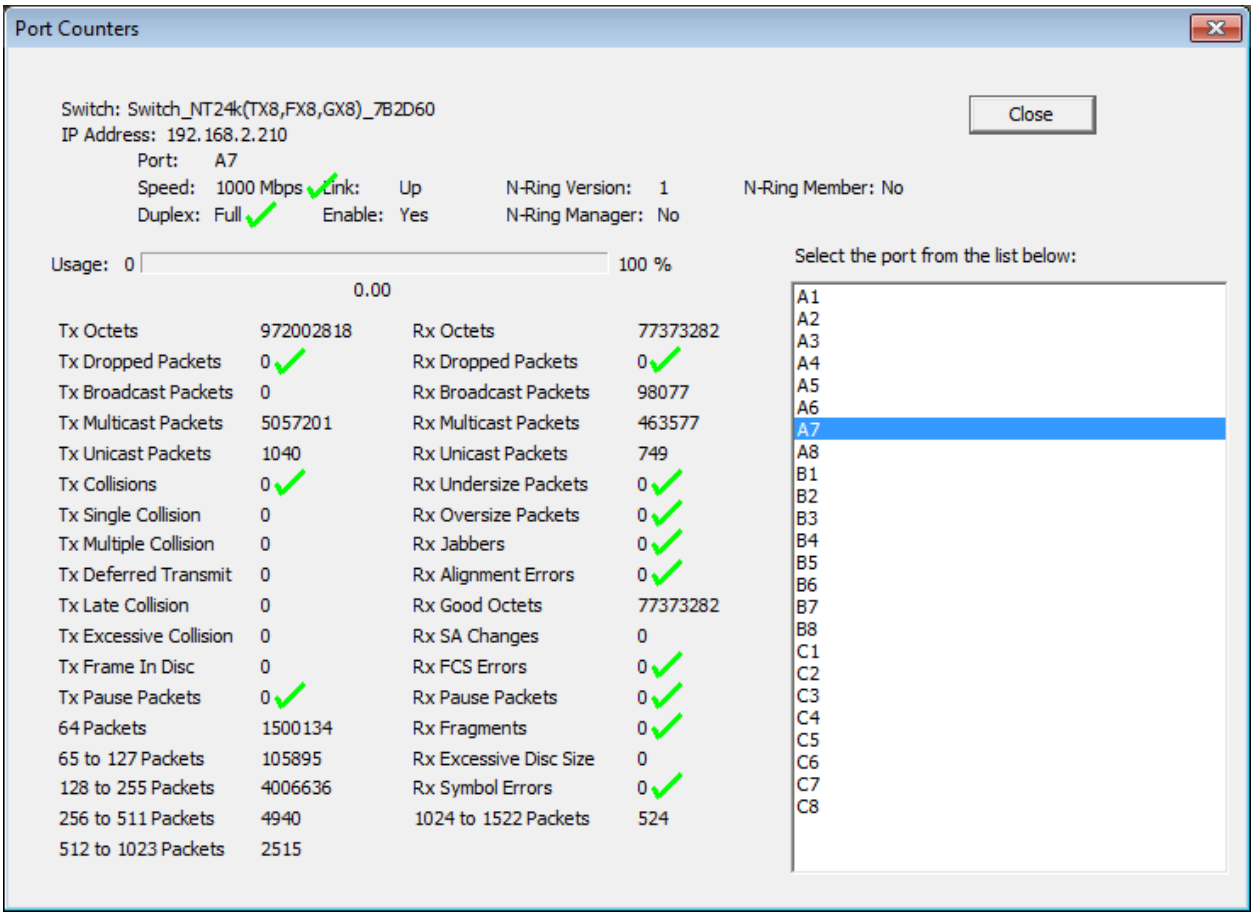
Example of a healthy switch port:



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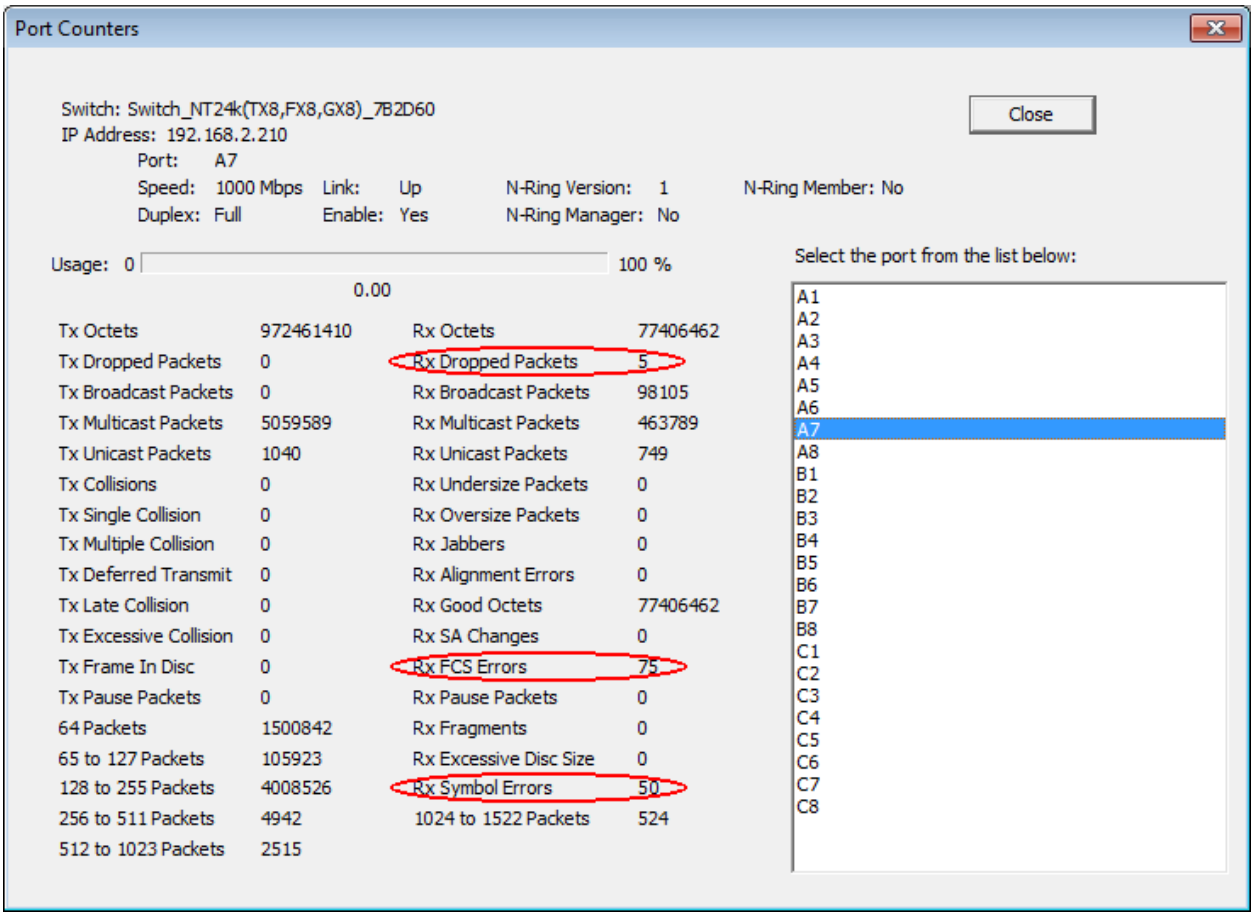
Example of potential cabling issues:



Automated Report

N-View can be launched from the command line and generate a list of all the switches found on-line. The output is stored to a text file. This makes it possible for on-site servers to run a batch file each morning that queries the switches and records the results. The results can then be automatically emailed to Customer Service, who can deploy the field techs to check a switch to see why it is off line. Problems can be solved before the end users even know there was one.

The command line interface will only detect and list switches that have been mapped through the graphical interface. Before running from the command line follow the steps in the *Mapping Switches* section. When called from the command line, the N-View application will be started and listen for switches on the network. After a short period, about 10 seconds, the application will close again and the results will be accessible.

The file produced (report.txt) will contain the creation time, MAC addresses and aliases for all the switches that were discovered during the 6+ second period. If report.txt already exists it will be overwritten with the new information. To keep a running log and/or to keep records on one or more adapters, a batch file or script will be needed to concatenate sequential report.txt files to another file or files.

The N-View executable can be found in the following directories:

32 bit Windows: “C:\Program Files\N-Tron\N-View”
64 bit Windows: “C:\Program Files (x86)\N-Tron\N-View”

The command line interface requires two arguments to be passed to N-View, the network adapter to listen on, and the report command. These must be surrounded by single quotes.

Example of the command line is below

N-View.exe 'FE575C-3COM 10/100 LAN CardBus-Fast Ethernet' 'report'

The first argument in the single quotes is the name of the adapter exactly as it is shown in the adapters list of N-View. For simplicity, copy it from the drop down box of N-View.
The word ‘report’ is not case sensitive.

Here is an example of a report.txt file:

```
Active Switches

12/05/2014 09:59:17 AM

00.07.AF.00.05.09  -  Switch 509FX00.07.AF.00.05.17  -  Switch 517FX
```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